

January 29, 1999

Federal Communications Commission
445 12th St., SW
Washington, D.C. 20554

To Whom It May Concern,

On behalf of the Navajo Nation, I respectfully submit the attached testimony regarding telecommunications issues.

If there are any questions or additional information required, please contact:

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Respectfully,

George Arthur, Council Delegate
San Juan and Nenahnezad Chapter
NAVAJO NATION COUNCIL

THE DEVELOPMENT OF INFORMATION TECHNOLOGY
ON THE NAVAJO NATION -- FULFILLING THE DREAM OF LIVING
IN HARMONY IN RESERVATION CYBERSPACE

Testimony Before the Federal Communications Commission
Albuquerque, New Mexico
January 29, 1999

It is an honor to present this testimony on behalf of the Navajo Nation and we are glad to see you here. I hope my words can shed some light on why the development of a Navajo Nation-wide telecommunications network is critical to the Navajo people. While our network has made significant strides over the past several years, implementing a sophisticated telecommunications network on a remote and expansive Indian reservation presents some unique legal and regulatory challenges. I submit there is still much work to be done on the tribal, state, and Federal levels to facilitate the process. The ultimate intent of the Navajo Nation is to link isolated areas of the Navajo Nation to local, state, regional, and national computing centers via a common network infrastructure. We wish to work with you jointly and cooperatively in this effort. Some background is in order.

The Navajo Nation covers approximately 25,000 square miles of land in Northern Arizona, Western New Mexico, and Southern Utah, which is roughly the size of West Virginia. The Navajo Nation government works directly with the three state governments of Arizona, Utah, and New Mexico; the United States Federal government; and four educational systems (BIA agency schools, public schools, contract/grant schools, and mission schools).

The Navajo Nation is a sovereign government providing a full complement of services to its 172,000 citizens, such as social services, economic development, education, health care, law enforcement, and a tribal court system. The figure of 172,000 is based on a 1992 census of Navajos living on the reservation and an additional 53,000 living off the reservation. Due to the poor economy in Navajo country, the Navajo Nation is losing population to off-reservation areas, particularly within the Four Corners region. Between 1980 and 1990, Navajos living on the Navajo reservation grew by 22%, while the off-reservation three-state areas of New Mexico, Arizona, and Utah grew by 124.5%. Navajos in the remaining 47 states grew by 71.4%. During the 1980s, 34 of the 109 Navajo Nation Chapters lost population to the larger Navajo communities or to off-reservation areas. At this pace, it is projected that by the year 2020, the Navajo population is projected to reach 585,000 with 53.3% living off-reservation.

The population of this remote, rural region of the Southwest retains a strong and distinct culture. Navajo is widely spoken (estimated at 82.04% of the Navajo language spoken at home) and traditional practices are maintained. Naturally, computer literacy among the Navajo People varies greatly.

The Navajo Nation has a sophisticated three branch system of government made up of the Legislative, Executive and Judicial Branches. The Navajo Nation Council consists of 88 Council delegates from the 110 Chapters around the Navajo Nation. The 110 Chapters lie in one of five districts or "Agencies" of the Navajo Nation.

With all of these factors, devising a sensible plan for wider access through the use of computer technology on the Navajo Nation does not simply involve connecting the dots of a proposed datalink. It means taking into account the rich set of cultural and religious beliefs of the Navajo People and achieving a strategy to coordinate the use and development of computer technology that has respect for the Navajo songs and prayers. It is also going to require an sizable financial investment.

There is also of course the serious problem of a lack of resources to provide for the infrastructure (51% of all residents of the Navajo Nation do not have indoor plumbing and 48% lack complete kitchen facilities.). The major source of heating homes on the Navajo Nation is wood, at 54%, with natural gas coming in a close second. 77.5% of the residents of the Navajo Nation still do not have telephone services. Because of a lack of adequate financial resources and the naturally deliberate pace of government in providing much needed basic services to residents of the Navajo Nation relative to the extremely quick pace of developments in technology, the government is always playing a losing game of catch-up.

A Telecommunication Economic and Feasibility Study was completed in April 1998 by Hicks & Ragland Engineering Company, Inc. The following are excerpts from this study.

It has been estimated that the present rates for Navajo Communications Company are:

One Party Business Line	\$57.15 per month
One Party Residential Line	\$15.90 per month

The estimated cost to connect a new subscriber is \$5,000. In the same study it was estimated that to acquire the current telephone facility, it will be approximately \$66,871,000. An additional investment of \$86,591,000 will have to be made for expansion and

upgrades in a high investment model that supports an array of services as ISDN, and \$21,651,000 for a low investment model over a ten year period.

It has been estimated that there is approximately a 25% penetration rate of residential subscribers. It has been estimated that even with an additional investment of \$86,591,000 that the number of residential subscribers would increase to 50%. Navajo Communications Company July 1998 reports show a total of 22,401 access lines; 10,757 are residential lines and 10,269 are business lines. In the Navajo Nation Profile of 1995, it has been estimated that there are 56,372 housing units. In comparison, the current residential penetration rate is actually lower at 19% not 25%.

Although there are over 250 primary and secondary schools throughout the Navajo Nation, very few of them have the resources to fund adequate computer classes; many school-age children are provided photo-copies of textbooks due to the fact that the schools cannot afford to purchase hard-bound copies. Purchasing computers for these schools is only a dream. Furthermore, the lack of paved roads and highways means that many school-age children stay home because of poor driving conditions. There are an estimated 53,264 enrolled Navajos from pre-primary to college. Of this number 82.2% are in elementary and high school.

In terms of health care, many patients on the Navajo Nation with illnesses requiring specialists are referred by Indian Health Services (IHS) to hospitals or private practitioners off-reservation because IHS does not have adequate telemedicine resources to provide for Navajo patients on the reservation. This problem is endemic throughout the Navajo Nation where Navajo patients are forced to seek non-IHS provided health care. Most of these patients are caught in the web of either not having health insurance and paying these off-reservation health care providers out pocket, or simply not seeking medical care at all due to exorbitant cost or the great distances to travel.

The lack of a tracking mechanism for program assistance applicants on the Navajo Nation is sorely in need of improvement. For example, in requests for housing assistance, a person can apply for such assistance from the Navajo Housing Authority; that same person can seek a HUD grant; that same person can also seek assistance from Navajo Housing Services and if a veteran, the applicant can apply for funds through the Veteran's Program. Interconnecting the Navajo Nation would help expedite services provided by housing loan officials on the reservation.

The opportunity to implement a telecommunications network on the Navajo Nation has been thwarted by unrelenting budgetary constraints. The lack of integrated voice, data, and video telecommunications services greatly limits the Navajo Nation's ability to extend services to rural areas in ways only larger communities can enjoy today.

In order to take advantage of emerging technologies to create, manage, and use information that could be of strategic importance to the Navajo Nation, the Navajo Nation Council in July 1992, by formal resolution mandated the creation of an "Open Information Environment" among the governmental entities of the Navajo Nation. This resolution mandates the coordination of the use and development of computer technology to achieve this "Open Information Environment" within our three branch system of government.

Under this same Navajo Nation Council resolution that authorized the "Open Information Environment", which in retrospect was a major piece of legislation, a "Standards Group" was formed to work with Navajo Nation technical support personnel to coordinate and facilitate strategic planning, coordinate technology acquisitions, establish and maintain technology standards, and inform respective Branch chiefs of relevant information or technology issues and concerns as they arise. The Navajo Nation Council also authorized a "Data Guardian" for the Navajo Nation which requires overseeing matters pertaining to information/technology and procedures; and to provide guidelines and define responsibilities with respect to the protection of information and the processing of data to ensure against loss, unauthorized modification of data, improper destruction of data, and the misuse or unauthorized disclosure of data whether accidental or intentional.

The following are issues that weigh heavily in the development of information technology:

Training

As with any new endeavor, funds must be set-aside for training. Technology is changing at such a rapid rate, that training will have to be on-going and continuous. Funds should be set aside for educational institutions on or near reservations to assist in this area. A good example is by UNM which had proposed a project entitled "Train the Trainers". This was an initiative to provide training for the computing and library staff/faculty at UNM so that they may train regional entities including the Navajo Nation. This training effort would support the Navajo Nation

initiative for a community network. The project by UNM would focus on ensuring that human resources will be in place in the region to support the training of people for both usage training and support training. The intent is to have personnel in place who can teach both adults and youth about what the Internet and telecommunications is and how they can use it. This type of endeavor will aid two major areas: education and employment. Given the scattered population, its youth and poverty, the Navajo Nation must have local expertise available to teach people how to use these technologies.

Federal Funds

These funds are allocated to support specific areas, such as education, health, human services, etc. Other than private grants to partially fund infrastructures, there is little Federal money to support the tribal information infrastructures. From a legislative perspective, it would be helpful if Federal and state programs utilized monies for long-term funding for this purpose.

By combining these resources, the Navajo Nation will be able to vastly improve its existing telecommunications infrastructure and take the first steps necessary to provide an equitable service delivery mechanism for all residents. The Nation will be able to continue and improve on its existing infrastructure with the goal of being self-sustaining.

Broadcast

Another area that can be improved is utilizing the local Navajo Broadcast station to broadcast training in disciplinary programs for nurse practitioners, physician assistants, certified nurse midwives, and medical students. This would enable these individuals to remain near their home communities on the reservation while engaging in basic science and clinical training.

The Public schools will have the ability to broadcast classes to schools in their districts that do not have the resources available to teach computer science and computer graphics design. Districts could share resources with other schools throughout the Navajo Nation on similar topics. Higher education institutions could broadcast classes to high school students to prep them for University/College level courses on a larger scale.

What should be noted here is that the entire broadcast could be in Navajo. Broadcasting will be geared specifically to the Navajo communities. Weather broadcasts, road conditions, emergency situations, etc. will be shared information. The local

TV affiliates broadcast some local news but seldom is it Navajo specific.

Currently the local Navajo station broadcasts to only a few communities. Their limitations on who, when, and where they can broadcast is based on the current service area limitations by the local cable company. As the local cable company improves, then Navajo Broadcast Services can improve.

Currently, 77.5% of the residents on the Navajo Nation do not have telephone services. Additionally, it can be assumed that a large majority of residences do not have access to cable TV. However, the percentage of radios in homes is probably close to 90%. The Use of Low Power Radio could reach an entire population of a small town without the costs or technological headaches of building and managing a full-power signal. The use of Low Power Radio could be used to encourage and assist all residents of the Navajo Nation to continue to learn and practice together in undeserved areas. Radio can bridge the existing geographical boundaries and contribute to a more unified system that covers all service aspects. It is anticipated that with improved technology as a means to access essential services, the need for telephone service may begin to slowly diminish. Through the use of radio, preventative medicine on diabetes and the hanta-virus could be broadcast quickly to many residents and could be heard in both Navajo and English.

State Public Utility Commissions

For those Tribal Nations who do not have or opt not to own their own telcos, TV stations, etc., need to ensure that the telcos are providing accurate data to the State Public Utility Commissions (PUC). There are no questions being asked by the PUCs to agree or dispute the rates that are reported. The status quo has not changed from previous years. It would seem that as the technology improves that the cost for improved services would eventually decrease over a period of time, however it seems that the cost actually increases yearly.

The Navajo Nation imposes a Navajo Business Activity tax to the local telco and this tax is placed back on the customer. According to the local telco, this is acceptable and was approved by the State PUCs.

911 Services

Customers on Navajo are being unfairly charged for 911 services. In actuality, there is no true 911 service. When 911 is dialed, it is transferred to a Tribal 4-digit extension number at the Police Department. This was brought to the attention of the

local telco, and the response was that this was a requirement imposed by the States. So by law they have to charge for 911 whether it is available or not.

Service Delivery

It has become more evident that improvements need to be made by the local telco. There is a high number of long distance calls that Tribal Programs are unable to make. The recording that is received is "Due to network congestion, your call cannot be completed at this time.." This also holds true for incoming calls. Again this was reported to the local telco, we were informed that this was because the Navajo Nation did not purchase enough trunk lines going out.

Although the existing telco can provide Centrex and frame relay, the Navajo Nation is not offered these services or these services are offered at a minimum. For instance, Centrex has the capability of allowing 4-digit dialing from one location to another. When Centrex was first introduced, a call originating from Window Rock, AZ to Tuba City, AZ (approximately 167 miles apart) 4-digit dialing was available. As of today, this same service is now a long distance toll call. When the local telco was questioned about this, we were informed that this feature was turned off because they were not making enough revenues. Although frame relay is available, this service is not offered to the Navajo government because there currently is no set tariff rates.

The Navajo Nation government currently pays approximately \$2.6 million dollars per year to the local telco for business lines. If the estimated average is \$15.90 per month for residential lines and there are currently 10,757 lines, the Navajo consumer is paying the local telco approximately \$2.5 million per year. This does not include long distance charges.

The Navajo Nation is the largest customer of the local telco, it was estimated at one point that the total revenues from Navajo alone was \$40 million. Although, this is reported as revenues generated and a statement was made that a large portion of this is put back into improvement of facilities on Navajo, it is not evident.

The Navajo Nation continually receives reports back on the cost of phone services that are unaffordable. In Pueblo Pintado, NM, a handicapped individual requesting for a telephone was notified by the local telco that it would cost \$15,000 to extend the line.

Joint Services

In several locations on the Navajo Nation, telephone services are provided by more than one company. For example, if a line goes down in Inscription House, Arizona, two calls have to be made. One company services the line, while the other services the system. Both companies have to be at Inscription House at the same time to provide service on the phone. If one shows and the other doesn't, the customer is still charged for the service call.

Satellite

Satellite services is not the technological solution because it is cost prohibitive. Although the local Police Department uses satellite in certain areas as well as radio, it is not reliable because not every mobile unit has the capability for satellite. There is still a large area on Navajo where there are dead zones for radio to be effective.

Rights of Way

There needs to be a more efficient way of regulating rights of ways on reservation. For example, there is fiber that was installed from New Mexico to Colorado which crosses into the eastern part of the Navajo Nation. The right of way was acquired by the local telephone company through a joint use agreement with the New Mexico State Highway Department. The Navajo Nation was not made aware of this joint use arrangement until after the fact. As a result, Navajo Nation had no proper input or influence to ensure that families and townships on this route will be guaranteed access to services provided through the use of fiber. The Navajo Nation has no jurisdiction and can charge no fee because of this.

Although it has been stated that approximately 77.5% of the Navajo people do not have telephones, it is not the objective of the Navajo Nation to provide each residence access to the technology. The intent is to develop localized access centers such as the agencies and chapters, which do of course have telephone service, thus enhancing accessibility opportunities for anyone having a need to utilize the infrastructure, whether for personal or professional development. Currently, most major services are accessed in this manner, i.e., service recipients commute to local service centers to access required and/or pertinent services. In this case, computer networks may be easily accessed from schools, libraries, or the chapter houses.

The Navajo Nation is unique in many respects: jurisdictional

overlaps into three different states with whom the Navajo Nation routinely collaborates; a distinct cultural identity and practices; diversity of educational systems; sovereignty and sophistication of its government; the grand scale of its high desert setting, and the close relationships the Navajo Nation has with border towns and affiliated businesses, services, and programs.

Without looking for a Third-World country outside the borders of the United States, it would almost seem impossible to identify a carbon copy setting of the Navajo Nation. The complexity and utility of the project as it is envisioned, once it is developed and refined, will embody a useful blueprint for replication almost anywhere, not merely for other Native American populations throughout the United States, but for any relatively technologically isolated populations throughout the world. In fact, it is precisely that replication of this technology infrastructure system into other Native American settings that would be made much easier and less complicated since the enumeration of factors and variables to be considered would be less--population considerations, variety of educational and belief systems, jurisdictional issues, etc. However, the outcome would be similar.

In sum, the majority of the existing information technology systems throughout the Navajo Nation are isolated and segmented, thus inhibiting consistency of information exchange and/or dissemination. The implementation of an information technology infrastructure for the Navajo Nation will: 1) enhance the provision of services particularly to the local grassroots population; 2) enhance communications among organizations and service entities; 3) expand the availability of resource options to entities such as medical facilities, legal operations, etc; 4) provide consistent and uniform resources to all educational systems; 5) create localized employment opportunities; 6) foster additional post-secondary educational opportunities; and 7) increase the information technology literacy of the Navajo Nation citizen.

In the final analysis, information is power. The development of a Navajo Nation information infrastructure is a historic event that holds many possibilities.

Thank you for your attention.

FEDERAL COMMUNICATIONS COMMISSION SUMMARY

STATISTICAL INFORMATION ON NAVAJO:

The Navajo reservation expands into three states, Arizona, New Mexico and Utah. Covers approximately 25,000 square miles.

Estimated population of 1992 census is 172,000 Navajo citizens living on the reservation, with an additional 53,000 living off the reservation. By the Year 2020, the population is expected to increase to 585,000.

The Navajo Nation Government is comprised of a three branch system, Legislative, Executive and Judicial. The Navajo Nation Council consists of 88 council delegates representing 110 chapters. The 110 chapters or communities lie within one of five agencies (districts) of the Navajo Nation.

Navajo is the first language spoken in most homes with a figure of 82.04%. Navajo culture and religious beliefs are still dominant.

There still is a lack of resources to provide for infrastructure, for example:

- 51% of all residents do not have indoor plumbing
- 48% lack complete kitchen facilities
- 54% use wood as a major source of heating with natural gas coming in second
- 77.5% of residents on the Navajo Nation does not have telephone service

There are over 250 primary and secondary schools throughout the Navajo Nation. There are an estimated 53,264 enrolled Navajos from pre-primary to college. 82.2% of this number are in elementary and high school.

ISSUES THAT WEIGH HEAVILY IN THE DEVELOPMENT OF INFORMATION TECHNOLOGY:

Based on a July 1998 report from the Navajo Communications Company, there are currently:

- 10,757 residential lines
- 10,269 business lines

There are a total of 56,372 housing units on the Navajo Nation. The residential penetration rate of telephone services is less than 25%.

The Navajo Nation government expends about \$2.6 million per year for business lines. Residence expends about \$2.5 million per year for residential lines. Please note that these figures do not include long distance charges. It is

Estimated that it costs:

- \$57.15 per month for one party business line
- \$15.90 per month for one party residential line

These figures are not accurate because they reflect the average cost of other rural telephone companies and other tribal entities that serve reservation areas in Arizona.

If the Navajo Nation wanted to purchase the local telco, it has been estimated to be about \$66,871,000. In addition, over a 10 year period, Navajo would have to invest anywhere from \$21,651,000 to \$86,591,000 for expansion and upgrades. Even with the investment at the high end, the number of customer served would increase to 50%.

Training

Technology is changing at such a rapid rate, that training will have to be on-going. Funds need to be made available to fund educational institutions on or near reservations to assist in this area. Similar to what the

University of New Mexico had proposed, "Train the Trainer". This project would focus on ensuring that human resources are in place in the region to support training of people on how to use new technologies.

Federal Funds

Funds are allocated to support specific areas as education, health, etc.,. From a legislative perspective it would be helpful if Federal and State programs had the flexibility to use these funds to support tribal information infrastructure.

Broadcast

Improve or create broader areas of local broadcasting using both television and radio. The emphasis of programming can be geared to community activities, education, preventative measures on diabetes, AIDS, etc. Currently these two do exist on the Navajo Nation, but they are commercialized and are in "it" for the profit making side. Utilizing these two areas would be beneficial in reaching a larger population. Radio can bridge the existing geographical boundaries and contribute to a more unified system that covers all service aspects. Another positive of local programming would be that entire shows can be done in Navajo. Local television broadcasting is limited by the local cable station. The local cable station provides limited services and has a small service area. Radio, however can have a larger audience at less the cost.

State Public Utility Commissions

The State PUCs need to be more active in ensuring that telcos are providing accurate data in justifying rates that are being charged to customers. The status quo has not changed from previous years.

A Navajo Nation Business Activity Tax is being charged to the local telco, however this cost is placed back on the customer. According to the local telco, this is acceptable and was approved by the State PUCs.

911 Services

There are no true 911 services on the Navajo Nation. When 911 is dialed, it is transferred to a four digit tribal extension at the Police Department, the dispatcher then receives the call. The 911 call is then relayed out to the police officer via radio. Thus, response time is lengthy. Customers are being unfairly charged for 911 services. When brought to the attention of the local telco, we were informed that this is a mandatory charge by the State PUCs, therefore it has to be paid for, whether 911 is available or not.

Service Delivery

It is evident that the local telco needs to upgrade its service delivery. Almost 50% of the time, when attempting to dial out long distance a recording is received that indicates due to network congestion, a call can't be made. This was brought to the attention of the local telco, we were informed that it was because the Navajo Nation did not purchase enough trunk lines going out.

Although Centrex and frame relay are available. Navajo is not afforded the opportunity to utilize these services. For example: when Centrex was first introduced, a call originating from Window Rock, AZ to Tuba City, AZ (a distance of 167 miles one way) was made through dialing four digits. As of today this no longer is offered. When the local telco was approached, we were informed that it was probably because not enough revenue was being charged, therefore the lines were switched back to toll.

The Nation continues to receive reports back on cost of phone services being unaffordable. A handicapped individual in Pueblo Pintado, NM requesting for phone services was told that it would cost \$15,000 to extend a phone line. It is estimated that it cost at a minimum of \$5,000 to connect one new subscriber.

Satellite

Satellite services are not the technological solution for Navajo. It is still expensive. Two-way radio is also not the solution. There are a number of areas on Navajo where there are dead zones. Not every mobile unit has satellite capability.

Rights of Way

There needs to be a more efficient way of regulating rights of ways on reservations. For example, there is fiber that was to be installed from New Mexico to Colorado, crossing the eastern part of the Navajo Nation.

The right of way was acquired by the local telephone company through a joint use agreement with the New Mexico State Highway Department. The Navajo Nation was not aware of this agreement until after the fact. As a result, Navajo has no influence to ensure that families and townships on this route will be guaranteed access to services provided through the use of fiber. The Navajo Nation has no jurisdiction and can charge no fee because of this.

In summary, it is not the intent of the Navajo Nation to place a telephone in every home or to place a computer in every home, but to develop localized access centers such as the agencies and chapters where access is available via a telephone or computer whether it be for personal or professional development.

Information is power. The development of a Navajo Nation information infrastructure is a historic event that holds many possibilities.

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The opportunity to implement a telecommunications network on the Navajo Nation has been thwarted by unrelenting budgetary constraints. The lack of integrated voice, data, and video telecommunications services greatly limits the Navajo Nation's ability to extend services to rural areas in ways only larger communities can enjoy today.

In order to take advantage of emerging technologies to create, manage, and use information that could be of strategic importance to the Navajo Nation, the Navajo Nation Council in July 1992, by formal resolution mandated the creation of an "Open Information Environment" among the governmental entities of the Navajo Nation. This resolution mandates the coordination of the use and development of computer technology to achieve this "Open Information Environment" within our three branch system of government.

Under this same Navajo Nation Council resolution that authorized the "Open Information Environment", which in retrospect was a major piece of legislation, a "Standards Group" was formed to work with Navajo Nation technical support personnel to coordinate and facilitate strategic planning, coordinate technology acquisitions, establish and maintain technology standards, and inform respective Branch chiefs of relevant information or technology issues and concerns as they arise. The Navajo Nation Council also authorized a "Data Guardian" for the Navajo Nation which requires overseeing matters pertaining to information/technology and procedures; and to provide guidelines and define responsibilities with respect to the protection of information and the processing of data to ensure against loss, unauthorized modification of data, improper destruction of data, and the misuse or unauthorized disclosure of data whether accidental or intentional.

The following are issues that weigh heavily in the development of information technology:

Training

As with any new endeavor, funds must be set-aside for training. Technology is changing at such a rapid rate, that training will have to be on-going and continuous. Funds should be set aside for educational institutions on or near reservations to assist in this area. A good example is by UNM which had proposed a project entitled "Train the Trainers". This was an initiative to provide training for the computing and library staff/faculty at UNM so that they may train regional entities including the Navajo Nation. This training effort would support the Navajo Nation

initiative for a community network. The project by UNM would focus on ensuring that human resources will be in place in the region to support the training of people for both usage training and support training. The intent is to have personnel in place who can teach both adults and youth about what the Internet and telecommunications is and how they can use it. This type of endeavor will aid two major areas: education and employment. Given the scattered population, its youth and poverty, the Navajo Nation must have local expertise available to teach people how to use these technologies.

Federal Funds

These funds are allocated to support specific areas, such as education, health, human services, etc. Other than private grants to partially fund infrastructures, there is little Federal money to support the tribal information infrastructures. From a legislative perspective, it would be helpful if Federal and state programs utilized monies for long-term funding for this purpose.

By combining these resources, the Navajo Nation will be able to vastly improve its existing telecommunications infrastructure and take the first steps necessary to provide an equitable service delivery mechanism for all residents. The Nation will be able to continue and improve on its existing infrastructure with the goal of being self-sustaining.

Broadcast

Another area that can be improved is utilizing the local Navajo Broadcast station to broadcast training in disciplinary programs for nurse practitioners, physician assistants, certified nurse midwives, and medical students. This would enable these individuals to remain near their home communities on the reservation while engaging in basic science and clinical training.

The Public schools will have the ability to broadcast classes to schools in their districts that do not have the resources available to teach computer science and computer graphics design. Districts could share resources with other schools throughout the Navajo Nation on similar topics. Higher education institutions could broadcast classes to high school students to prep them for University/College level courses on a larger scale.

What should be noted here is that the entire broadcast could be in Navajo. Broadcasting will be geared specifically to the Navajo communities. Weather broadcasts, road conditions, emergency situations, etc. will be shared information. The local

TV affiliates broadcast some local news but seldom is it Navajo specific.

Currently the local Navajo station broadcasts to only a few communities. Their limitations on who, when, and where they can broadcast is based on the current service area limitations by the local cable company. As the local cable company improves, then Navajo Broadcast Services can improve.

Currently, 77.5% of the residents on the Navajo Nation do not have telephone services. Additionally, it can be assumed that a large majority of residences do not have access to cable TV. However, the percentage of radios in homes is probably close to 90%. The Use of Low Power Radio could reach an entire population of a small town without the costs or technological headaches of building and managing a full-power signal. The use of Low Power Radio could be used to encourage and assist all residents of the Navajo Nation to continue to learn and practice together in undeserved areas. Radio can bridge the existing geographical boundaries and contribute to a more unified system that covers all service aspects. It is anticipated that with improved technology as a means to access essential services, the need for telephone service may begin to slowly diminish. Through the use of radio, preventative medicine on diabetes and the hanta-virus could be broadcast quickly to many residents and could be heard in both Navajo and English.

State Public Utility Commissions

For those Tribal Nations who do not have or opt not to own their own telcos, TV stations, etc., need to ensure that the telcos are providing accurate data to the State Public Utility Commissions (PUC). There are no questions being asked by the PUCs to agree or dispute the rates that are reported. The status quo has not changed from previous years. It would seem that as the technology improves that the cost for improved services would eventually decrease over a period of time, however it seems that the cost actually increases yearly.

The Navajo Nation imposes a Navajo Business Activity tax to the local telco and this tax is placed back on the customer. According to the local telco, this is acceptable and was approved by the State PUCs.

911 Services

Customers on Navajo are being unfairly charged for 911 services. In actuality, there is no true 911 service. When 911 is dialed, it is transferred to a Tribal 4-digit extension number at the Police Department. This was brought to the attention of the

local telco, and the response was that this was a requirement imposed by the States. So by law they have to charge for 911 whether it is available or not.

Service Delivery

It has become more evident that improvements need to be made by the local telco. There is a high number of long distance calls that Tribal Programs are unable to make. The recording that is received is "Due to network congestion, your call cannot be completed at this time.." This also holds true for incoming calls. Again this was reported to the local telco, we were informed that this was because the Navajo Nation did not purchase enough trunk lines going out.

Although the existing telco can provide Centrex and frame relay, the Navajo Nation is not offered these services or these services are offered at a minimum. For instance, Centrex has the capability of allowing 4-digit dialing from one location to another. When Centrex was first introduced, a call originating from Window Rock, AZ to Tuba City, AZ (approximately 167 miles apart) 4-digit dialing was available. As of today, this same service is now a long distance toll call. When the local telco was questioned about this, we were informed that this feature was turned off because they were not making enough revenues. Although frame relay is available, this service is not offered to the Navajo government because there currently is no set tariff rates.

The Navajo Nation government currently pays approximately \$2.6 million dollars per year to the local telco for business lines. If the estimated average is \$15.90 per month for residential lines and there are currently 10,757 lines, the Navajo consumer is paying the local telco approximately \$2.5 million per year. This does not include long distance charges.

The Navajo Nation is the largest customer of the local telco, it was estimated at one point that the total revenues from Navajo alone was \$40 million. Although, this is reported as revenues generated and a statement was made that a large portion of this is put back into improvement of facilities on Navajo, it is not evident.

The Navajo Nation continually receives reports back on the cost of phone services that are unaffordable. In Pueblo Pintado, NM, a handicapped individual requesting for a telephone was notified by the local telco that it would cost \$15,000 to extend the line.

Joint Services

In several locations on the Navajo Nation, telephone services are provided by more than one company. For example, if a line goes down in Inscription House, Arizona, two calls have to be made. One company services the line, while the other services the system. Both companies have to be at Inscription House at the same time to provide service on the phone. If one shows and the other doesn't, the customer is still charged for the service call.

Satellite

Satellite services is not the technological solution because it is cost prohibitive. Although the local Police Department uses satellite in certain areas as well as radio, it is not reliable because not every mobile unit has the capability for satellite. There is still a large area on Navajo where there are dead zones for radio to be effective.

Rights of Way

There needs to be a more efficient way of regulating rights of ways on reservation. For example, there is fiber that was installed from New Mexico to Colorado which crosses into the eastern part of the Navajo Nation. The right of way was acquired by the local telephone company through a joint use agreement with the New Mexico State Highway Department. The Navajo Nation was not made aware of this joint use arrangement until after the fact. As a result, Navajo Nation had no proper input or influence to ensure that families and townships on this route will be guaranteed access to services provided through the use of fiber. The Navajo Nation has no jurisdiction and can charge no fee because of this.

Although it has been stated that approximately 77.5% of the Navajo people do not have telephones, it is not the objective of the Navajo Nation to provide each residence access to the technology. The intent is to develop localized access centers such as the agencies and chapters, which do of course have telephone service, thus enhancing accessibility opportunities for anyone having a need to utilize the infrastructure, whether for personal or professional development. Currently, most major services are accessed in this manner, i.e., service recipients commute to local service centers to access required and/or pertinent services. In this case, computer networks may be easily accessed from schools, libraries, or the chapter houses.

The Navajo Nation is unique in many respects: jurisdictional

overlaps into three different states with whom the Navajo Nation routinely collaborates; a distinct cultural identity and practices; diversity of educational systems; sovereignty and sophistication of its government; the grand scale of its high desert setting, and the close relationships the Navajo Nation has with border towns and affiliated businesses, services, and programs.

Without looking for a Third-World country outside the borders of the United States, it would almost seem impossible to identify a carbon copy setting of the Navajo Nation. The complexity and utility of the project as it is envisioned, once it is developed and refined, will embody a useful blueprint for replication almost anywhere, not merely for other Native American populations throughout the United States, but for any relatively technologically isolated populations throughout the world. In fact, it is precisely that replication of this technology infrastructure system into other Native American settings that would be made much easier and less complicated since the enumeration of factors and variables to be considered would be less--population considerations, variety of educational and belief systems, jurisdictional issues, etc. However, the outcome would be similar.

In sum, the majority of the existing information technology systems throughout the Navajo Nation are isolated and segmented, thus inhibiting consistency of information exchange and/or dissemination. The implementation of an information technology infrastructure for the Navajo Nation will: 1) enhance the provision of services particularly to the local grassroots population; 2) enhance communications among organizations and service entities; 3) expand the availability of resource options to entities such as medical facilities, legal operations, etc; 4) provide consistent and uniform resources to all educational systems; 5) create localized employment opportunities; 6) foster additional post-secondary educational opportunities; and 7) increase the information technology literacy of the Navajo Nation citizen.

In the final analysis, information is power. The development of a Navajo Nation information infrastructure is a historic event that holds many possibilities.

Thank you for your attention.

Internet availability is scarce, spotty, and a story of extremes.

Examples

- Ft. Defiance has a lab of 30 G-3 Internet connected computers for 3rd graders, but no cell service.
- Western Alaska has Internet connections in schools, but no other telephone service or electricity outside of the school.
- In Kayenta, AZ a T-1 connected lab exists but students are only on it for 20 per week and teachers have virtually no time on the lab and it is locked up after school hours.
- In a BIA school in New Mexico, only the coaches have Internet access.
- Schools how have been sold T-1 lines often find their lines are running only at one fifth or less of a T-1 line
- Schools in western Alaska and other places find that the last mile is not covered by local telcos and when consumers develop a plan to connect the last mile, the local telco uses political pressure to prevent the hookup because they will not profit from it.
- A Chapter House on the Navajo Indian Reservation can't afford a \$1,200 monthly VSAT bill.
- The elementary school at Hotevilla can't afford a \$600 per month telephone bill for a single 56 kbps line just to connect to a free Internet service as provided by this university at a location across the Hopi Reservation.
- A high school at Tuba city can't afford to leased a 56-kbps data line to the nearest Internet service at the rate of \$17,400 per year.
- **The disallowance by the E-Rate folks of interexchange carrier cost** relegates a private hospital to either no telemedicine services from the University of Arizona (at \$67,000 per year for a T-1 between Ganado and the Telemedicine Network ATM hub at NAU-Flagstaff) or sends the UA Medical Center scrambling to find a source to help pay such an exorbitant telephone bill.
- And how about the school that waited two years to get a response to having an additional phone line installed?
- Or Rocky Ridge Boarding School on the Navajo Reservation -- whose one-line radio phone is down more than its up -- having to build its own wireless connection to a school on the Hopi Reservation just to have Internet?
- **Northern Arizona University offers free Internet service to reservation-based schools** where the university has interactive instructional television sites (Kayenta, Tuba City, Keams Canyon, Ft. Defiance and Chinle, with Ganado, Peach Springs and Whiteriver to be completed this fiscal year). Monument Valley High School tells NAU that there are now as many as a thousand computers with access to the Internet in the Kayenta area. While we welcome local- and regional-area schools to join at the Internet routers we place at our hosts' premises, **many cannot join us due to the phone company not having lines available, or the leased-line costs are just too great. And this is for a FREE service once they get there.**
- The Navajo Indian Reservation has more than 150 K-12 schools, the vast majority in the most isolated of locations. Even if the BIA, IHS, and other agencies and institutions were to join together to build carriage systems and share bandwidth, it will take an extraordinary effort to connect the dozens of small schools and tribal government entities (such as the Navajo Reservation's 110 Chapter Houses) still at some distance from agency and institutional centers.